CHROMOSOME NUMBERS IN RACES OF HAPLOPAPPUS DIVARICATUS[1]

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Haplopappus divaricatus (Nutt.) Gray is a wide-ranging annual with a distribution in north-central Kansas, southward through Oklahoma and Texas, eastward through the Gulf Coast states, and northward on the Atlantic seaboard to South Carolina. It is sometimes treated as a distinct genus, *Croptilon*, but Hall (1928) placed it in the section *Isopappus* of *Haplopappus* with another species, *H. occidentalis*. However, Keck (1956) has raised *H. occidentalis* to generic status as *Benitoa occidentalis* and *H. divaricatus* remains the only species of the section.

Chromosome counts of $n = 4$ (Turner, 1960) and $n = 5$ (Jackson, 1959) have been reported for *H. divaricatus*. To determine the significance of the distribution of these numbers, field studies were made through Kansas, Oklahoma, Texas, and parts of Arkansas. In addition, seed was obtained from Georgia and Florida. Live transplants were collected for hybridizations, buds were fixed for cytological study, and herbarium specimens were made for later measurement.

From these studies, five morphologically distinct "races" have been found which form an aneuploid series of $n = 4$, $n = 5$, $n = 6$, and $n = 7$. Table 1 gives brief morphological descriptions of the races, their chromosome numbers, and collection sites. A more complete delimitation of their morphological variation must await detailed population studies. Figures 1-6 are meiotic metaphase I configurations of four of the races.

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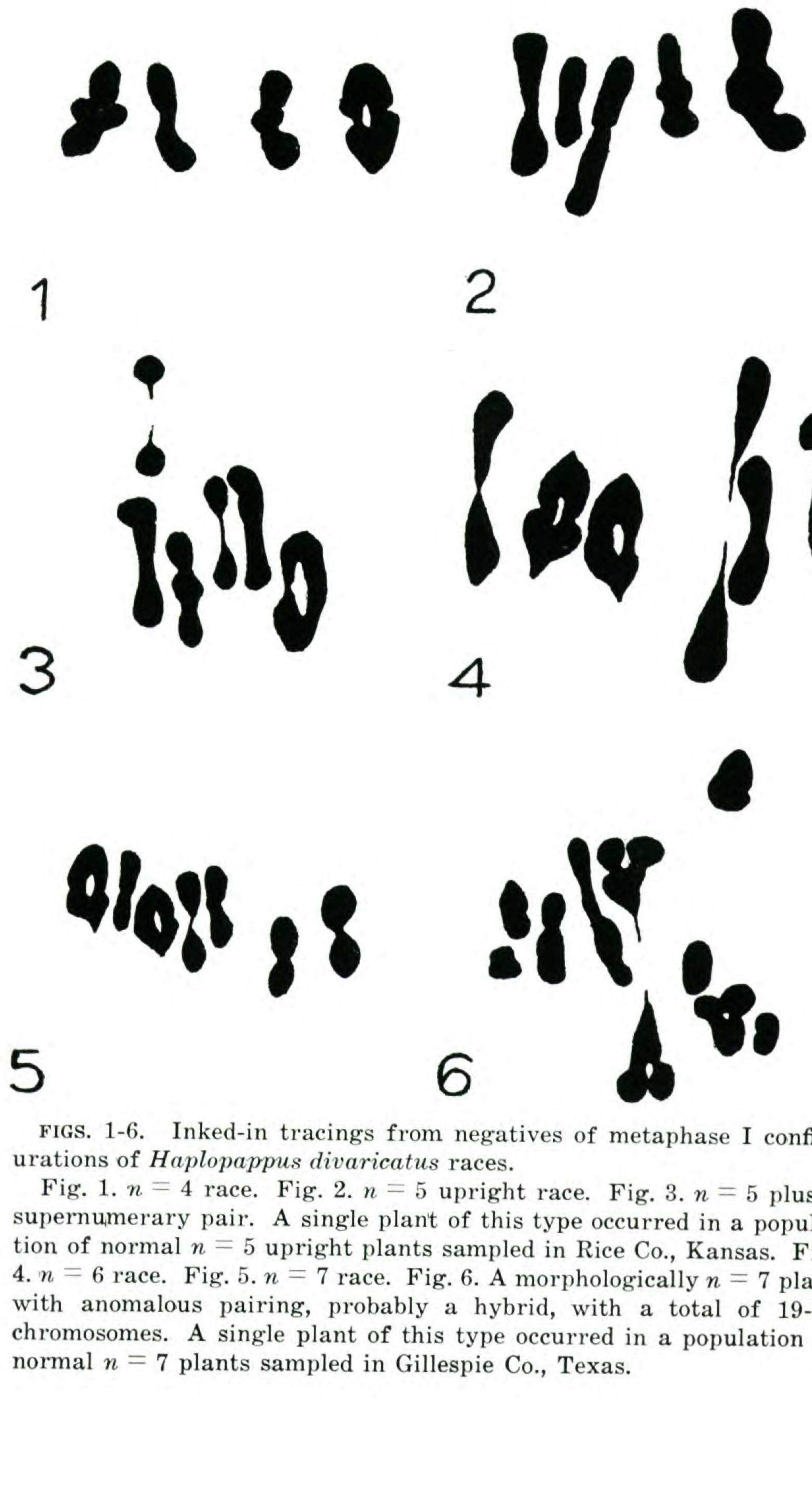

FIGS. 1-6. Inked-in tracings from negatives of metaphase I configurations of *Haplopappus divaricatus* races.

Fig. 1. $n = 4$ race. Fig. 2. $n = 5$ upright race. Fig. 3. $n = 5$ plus 1 supernumerary pair. A single plant of this type occurred in a population of normal $n = 5$ upright plants sampled in Rice Co., Kansas. Fig. 4. $n = 6$ race. Fig. 5. $n = 7$ race. Fig. 6. A morphologically $n = 7$ plant with anomalous pairing, probably a hybrid, with a total of 19-20 chromosomes. A single plant of this type occurred in a population of normal $n = 7$ plants sampled in Gillespie Co., Texas.

TABLE 1. Descriptions, chromosome numbers, and collection sites of the races of *Haplopappus divaricatus*.

Description	n	Collection Sites
Upright, broad-leaved, small heads	4	OKL., McCURTAIN Co., 0.4 mi. n. of Tom. ARK., LITTLE Co., 5 mi. n.w. of Winthrop. GA., TIFT Co., near Tifton. FLA., LEON Co., 4 mi. s.e. of Tallahassee.
Upright, broad-leaved, medium-sized heads	5	KANS., DICKENSON Co., 2.9 mi. w. of Abilene. SUMNER Co., 2 mi. w. of Argonia. HARPER Co., 1.2 mi. e. of Harper.
Decumbent, medium-width leaves, small heads	5	TEX., GONZALES Co., 10 mi. n.w. of Gonzales. ARANSAS Co., Goose Island State Park. BROOKS Co., 8 mi. s. of Falfurrias. LIVE OAK Co., 3.9 mi. n. of Three Rivers.
Upright, medium-width leaves, medium-sized heads.	6	TEX., GUADALUPE Co., 7 mi. s. of Seguin. GOLIAD Co., 3.6 mi. n.w. of Charco. GONZALES Co., 1.2 mi. n. of Gonzales.
Upright, narrow-leaved, large heads	7	TEX., BURNET Co., Inks Lake Park. GILLESPIE Co., 4 mi. n. of Fredricksburg. MASON Co., 2 mi. s. of Air.

Intraracial perenniality was observed in several collections of the $n = 5$ decumbent race. Studies of somatic chromosomes show this to have the most symmetrical genome of the five races. Since perenniality in growth and symmetry of genome are both considered primitive characteristics (Stebbins, 1950), this race may be the progenitor of the other races. If this is true, then aneuploidy in the species would be ascending and descending. Documented evidence for ascending aneuploidy in the Compositae is lacking (Jackson, 1962).

Study of meiotic pairing in F_1 intraracial hybrids, presently being grown, should disclose whether aneuploidy in the species is ascending, descending, or a combination of the two.

In addition, presence or absence of hybrid sterility barriers will be useful in delimiting by formal taxonomic rank the entities referred to here as races.

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